of species each for *Poa* and *Agrostis* as follows: *Poa rupicola, P. Suksdorfii, Agrostis humilis,* and *A. Rossae.* Here, also, *Alopecurus geniculatus, A. aequalis* and *Koeleria cristata* occur as a disrupted and isolated part of their distribution for they are known also from northern and coastal California. Study has failed to reveal specific differences in the high montane phases of these last three species. It is of unusual interest, then, to find in these California mountains a dwarf species of *Glyceria,* of the section *Hydropoa* Dum., associated on the margins of alpine lakes with the equally restricted *Scirpus Clementis* Jones.

Glyceria californica sp. nov. Perennis pusilla; culmi erecti, usque ad 2 dm. alti; laminae usque ad 5 mm. latae; paniculae viride aut purpurascentes, erectae, scabrae, 3–6 cm. longae; spiculae circa 3 mm. longae, cum 3 ad 5 floris; glumae obtusae, gluma prima 1.26 mm. longa, gluma secunda 1.75 mm. longa; lemmae inferiorae cum 7 nervis, scabrae; paleae subaequalae.

Dwarf perennial; culms not over 2 dm. tall; blades up to 5 mm. broad, frequently exceeding the panicle; panicle green or becoming purple, 3–6 cm. long, erect, the short branches ascending, strongly scabrous; spikelets ca. 3 mm. long, 3- to 5-flowered; glumes broadly obtuse, the first 1.25 mm. long, the second 1.75 mm. long; lower fertile lemmas 3 mm. long, prominently 7-nerved, scabrous on and between the nerves, the apices erose; palea subaequal.

Type. Farewell, Tulare County, California, altitude 10,000 to 11,000 feet, *C. A. Purpus 2057* (type, Herbarium of the University of California, no. 121966). Also known from Rae Lake, Fresno County, *Mrs. Joseph Clemens* in 1910 (Clokey Herbarium at the University of California, Berkeley).

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A LIST OF ALGAE CHIEFLY FROM THE ALPINE ZONE OF LONGS PEAK, COLORADO

Walter Kiener

Phytogeographic considerations make it important to call attention to the fact that Colorado has a range of elevation from 3350 feet above sea level (at the Arkansas River, Prowers County) to 14,420 feet at Mount Elbert. The approximate mean elevation for the entire state, as determined by the United States Geological Survey, is 6800 feet, which is higher than the average elevation of any other of the United States of America.

This wide range of elevation implies a wide range of climatic conditions to which the vegetation is adapted and results in the

presence of a great variety of floral elements. Climatic conditions and characteristics of the flora in the alpine zone on Longs Peak are similar in many ways to those prevailing above the Arctic Circle. Not enough is known at the present time about the distribution of the algae in the alpine zone of the mountains of the United States to draw conclusions regarding the characteristic distribution patterns of the ninety-two entities here enumerated.

The data and the specimens here reported came chiefly from the alpine zone on Longs Peak, and were made as a part of a detailed survey of the vegetation of the alpine zone on that mountain. A few other collections from the lower life zones of Longs Peak and vicinity, as well as from other areas are listed here for the phytogeographic record. The collection numbers are those of the author. A given number may appear under several species because the collection contained an inseparable mixture. On the herbarium label the most abundant species is listed first, and the mixed specimen is filed under that species name.

Longs Peak is located at about latitude 40 degrees north. The alpine zone reaches from approximately 11,000 feet to 14,255 feet, the summit of Longs Peak. There is much overlapping of habitats between the alpine zone and the subalpine zone. Some alpine habitats may be as low as 11,000 feet, whereas, subalpine habitats under favorable conditions may be found up to nearly 12,000 feet. A habitat is here considered alpine or subalpine, respectively, on the basis of the kind of vegetation it supports. The county line between Larimer and Boulder counties crosses Longs Peak almost on its summit. Boulder Field is a shallow basin on the north flank of Longs Peak, and Chasm Lake in Chasm Gorge is on the east flank.

The writer is indebted to Mildred Hallberg Jones for many identifications in the earlier stages of the work. For the determinations of the diatoms, credit is due Dr. Ruth Patrick of the Philadelphia Academy of Sciences. But the identifications of nearly all specimens were made by Dr. Francis Drouet of the Chicago Natural History Museum, where the specimens are now on file in the cryptogamic herbarium. Without his help, always courteous and efficient, this list could not have been completed.

Chroococcaceae

Chroococcus turgidus (Kütz.) Näg. Larimer County: Boulder Field, 12,560 feet; alpine; with other algae in small streamlet, September 16, 1933, *171*. Custer County: South Colony Basin at base of Humboldt Peak, 11,500 feet; subalpine; over mosses on soil, July 9, 1941, *10393*.

Gloeocapsa violacea Kütz. Boulder County: Middle St. Vrain Valley, 7900 feet; montane; with other algae forming a purple-

reddish crust on north-facing, intermittently wet, siliceous cliffs, October 11, 1937, *6245*.

Gloeocapsa granosa (Berk.) Kütz. Larimer County: north slope of Mount Lady Washington, 12,000 feet; alpine; among squamulose lichens of snowpatch vegetation, July 31, 1936, *4434;* Boulder Field, 12,700 feet; alpine; on thallus of the lichen *Solorina crocea* in snowpatch vegetation, September 5, 1935, *7640*. Boulder County: alpine shore of Chasm Lake, 11,900 feet; alpine; among hepatics and squamulose lichens, July 25, 1938, *6410*.

Gloeocapsa magma (Breb.) Kütz. Larimer County: near Chasm Lake, 11,700 feet; alpine; with other algae forming a blackish crust on wet, siliceous cliffs near Chasm Lake, October 7, 1937, *5682*. Boulder County: Middle St. Vrain Valley, 7900 feet; montane; with other algae forming a reddish crust on north-facing, intermittently wet, siliceous cliffs, October 11, 1937, *6245*. Custer County: South Colony Basin at base of Humboldt Peak, 11,500 feet; subalpine; on soil over mosses and pebbles, July 9, 1941, *10392, 10393, 10394*.

Aphanocapsa rivularis (Carm.) Rabh. Larimer County: east slope of Longs Peak at timberline, 11,100 feet; subalpine; with diatoms in shallow streamlet, September 8, 1933, *156;* Boulder Field, 12,700 feet; alpine; on thallus of *Solorina crocea* in snowpatch vegetation, September 5, 1935, *7644*. Custer County: South Colony Basin at base of Humboldt Peak, 11,500 feet; subalpine; over mosses on soil, July 9, 1941, *10393a*.

Anacystis marginata Menegh. Boulder County: Peaceful Valley, 9500 feet; subalpine; with other algae in shallow pool in spruce-fir forest, August 5, 1934, *1268;* summit of Longs Peak, 14,250 feet; alpine; growing over moss on intermittently wet rocks, September 14, 1936, *4768;* near Sandbeach Lake, 10,350 feet; subalpine; over lichen on wet ground of spruce-fir forest, September 12, 1937, *5597*.

Anacystis Peniocystis (Kütz.) Dr. and Daily. Boulder County: Peaceful Valley, 9500 feet; subalpine; with other algae in shallow pool in spruce-fir forest, August 5, 1934, *1268;* near Chasm Lake, 11,800 feet; alpine; on intermittently wet, siliceous cliffs, September 18, 1934, *1277*.

Anacystis rupestris (Lyngb.) Dr. and Daily. Park County: Hoosier Pass, 11,000 feet; subalpine; growing over moss on wet ground, September 1, 1938, *6705a*. Larimer County: Lily Lake, 9000 feet; montane; shallow water of shore, September 22, 1942, *13175*.

Synechococcus aeruginosus Nag. Custer County: South Colony Creek, 11,500 feet; subalpine; growing over moss on rock ledge, July 9, 1941, *10393a*.

Chamaesiphonaceae

Chamaesiphon incrustans Grun. Boulder and Larimer counties: alpine; apparently fairly common on filaments of various

algae in streamlets and on wet cliffs at altitudes from 11,000 to 13,800 feet on Longs Peak. Tentative determinations were made, but no herbarium specimens prepared. The species was found to grow in one instance also on moss protonema and in another on fragments of submerged dead moss leaves.

Chamaesiphon polonicus (Rostaf.) Hansg. Boulder County: Chasm Gorge, 12,000 feet; alpine; on wet cliffs with lichen, September 21, 1936, *4187a.*

Chamaesiphon Rostafinskii Hansg. Larimer County: Alpine Brook at base of Longs Peak, 8900 feet; montane; shallow, running water, September 22, 1942, *13126.*

Oscillatoriaceae

Oscillatoria amphibia Gom. Larimer County: Boulder Field, 12,500 feet; alpine; with other algae in shallow streamlet, August 22, 1933, *154, 155, 156;* east slope at timberline on Longs Peak, 11,200 feet; subalpine; in shallow streamlets supplied by snow water, September 20, 1933, *178;* Granite Pass on Longs Peak, 11,900 feet; alpine; with other algae in shallow streamlet, September 20, 1932, *1428.*

Oscillatoria limosa Gom. Larimer County: Boulder Field, 12,500 feet; alpine; in shallow streamlet, August 22, 1933, *156.*

Oscillatoria proboscidea Gom. Larimer County: Boulder Field, 12,500 feet; alpine; in shallow streamlet, September 16, 1933, *157.*

Phormidium ambiguum Gom. Boulder County: north face of Longs Peak, 13,800 feet; alpine; among wet, siliceous rocks, September 10, 1937, *5570.*

Phormidium autumnale Gom. Boulder County: east face of Longs Peak, 12,500 feet; alpine; over wet mosses, August 9, 1936, *3860;* Chasm Gorge, 12,000 feet; alpine; with lichens on wet rocks, September 21, 1936, *4197.*

Phormidium subfuscum Gom. Boulder County: west face of Longs Peak, 13,300 feet; alpine; with lichens on wet, siliceous rocks, September 20, 1935, *3408a.*

Phormidium subfuscum var. Joannianum Gom. Boulder County: Mount Alice, 11,700 feet; alpine; with *Hydrurus foetidus* in cold spring rivulet, August 23, 1938, *6453.*

Phormidium uncinatum Gom. Larimer County: Alpine Brook at base of Longs Peak, 8900 feet; montane; reddish film in shallow running water, September 22, 1942, *13127.*

Lyngbya Diguetii Gom. Larimer County: Longs Peak, 9600 feet; subalpine; in rapids of Alpine Brook, September 11, 1935, *3361a.*

Lyngbya versicolor Gom. Boulder County: north face of Longs Peak, 14,000 feet; alpine; over mosses on wet ledge (cultured in laboratory), July 25, 1933, *167b.*

Symploca muscorum (Ag.) Gom. Larimer County: east slope of Longs Peak, 11,100 feet; subalpine; over mosses among willows, August 15, 1934, *1603a;* among mosses and grasses, August 15, 1934, *1606;* on rotting wood on soil, September 16, 1934, *1753.* Park County: south side of Hoosier Pass, 11,100 feet; subalpine; over moss on wet ground, September 1, 1938, *6710.* Custer County: South Colony Basin at base of Humboldt Peak, 11,500 feet; subalpine; on soil among *Riccia* and *Selaginella, 10210;* on soil among mosses, July 8, 1941, *10262.*

Microcoleus lacustris Gom. Custer County: South Colony Basin at base of Humboldt Peak, 11,700 feet; subalpine; soil among mosses, August 8, 1941, *10275.*

Microcoleus vaginatus Gom. Larimer County: east slope of Longs Peak at timberline, 11,100 feet; subalpine; over mosses on ground, September 16, 1934, *1753.* Boulder County: Keyhole on Longs Peak, 13,200 feet; alpine; damp walls inside of primitive stone shelter, September 20, 1935, *3404.* Custer County: South Colony Basin at base of Humboldt Peak, 11,700 and 12,000 feet; subalpine; soil among bryophytes and lichens, July 8, 1941, *10207, 10262, 10275.*

Schizothrix Heufleri Gom. Larimer County: near Chasm Lake, 11,700 feet; alpine; with other algae forming a blackish, shiny crust of considerable extent on wet, siliceous cliffs, October 7, 1937, *5682.* Teton County, Wyoming: on rocks at the subalpine shore of Jenny Lake, 6775 feet, September 8, 1936, *6065.*

Schizothrix lacustris Gom. Larimer County: Alpine Brook on Longs Peak, 9600 feet; subalpine; on rocks in rapids, September 18, 1935, *3361b.*

Schizothrix Muelleri Gom. Larimer County: east slope on Longs Peak, at timberline, 11,100 feet; subalpine; among grasses and mosses, August 15, September 16, 1934, *1603, 1606, 1611.*

Schizothrix purcellii W. R. Tayl. Larimer County: Boulder Field, 12,570 feet; alpine; soil among mosses in *Elyna Bellardi* community, September 12, 1935, *3253a.* Custer County: South Colony Basin at base of Humboldt Peak, 11,700 feet; subalpine; on ground over mosses, July 21, 1939, *6956.* Clear Creek County: Berthoud Pass, 10,500 feet; subalpine; among mosses, July 10, 1942, *W. L. Tolstead 10181a.*

Schizothrix tinctoria Gom. Larimer County: Alpine Brook on Longs Peak, 9600 feet; subalpine; on rocks in rapids, September 18, 1935, *3361.*

Schizothrix fragilis Gom. Larimer County: Boulder Field, 12,700 feet; alpine; on thallus of the lichen *Solorina crocea* in snowpatch vegetation, September 5, 1935, *7642.*

Plectonema Nostocorum Gom. Larimer County: near Chasm Lake, 11,800 feet; subalpine; on intermittently wet, siliceous cliff, September 18, 1934, *1277;* Alpine Brook on Longs Peak, 9600 feet; subalpine; on rocks in rapids, September 18, 1935, *3361;*

Lily Lake, 9000 feet; montane; shallow water of shore, September 22, 1942, *13175*.

Plectonema purpureum Gom. Larimer County: east slope at timberline on Longs Peak, 11,100 feet; subalpine; inside of old bottle on soil under willows, September 15, 1933, *168*.

Nostocaceae

Nostoc commune B. and F. Larimer County: Boulder Field, 12,560 feet; alpine; shallow streamlet, August 22, 1933, *142, 146*. Boulder County: east face of Longs Peak, 13,800 feet; alpine; over mosses on wet, siliceous rock-ledges, August 16, 1934, *1286*. Park County: Hoosier Pass, 11,000 feet; subalpine; on wet ground over mosses, September 1, 1938, *6709*. Saguache County: Kit Carson Peak, 13,000 feet; alpine; in shallow cold-water pool, August 27, 1938, *6511*. Custer County: South Colony Basin at base of Humboldt Peak, 11,700 feet; subalpine; soil among bryophytes and lichens, July 8, 1941, *10262*.

Nostoc cf. muscorum B. and F. Microscopic study of mosses and lichens collected on Longs Peak at elevations ranging from 8000 to 13,700 feet showed this species to be present in eight collections. It was identified tentatively according to descriptions in the literature.

Nostoc parmelioides B. and F. Larimer County: Alpine Brook at base of Longs Peak, 8900 feet; montane; rocks in swift water, September 22, 1942, *13132;* Roaring River below Lawn Lake, 10,500 feet; subalpine; rocks in swift water, September 22, 1942, *13206*.

Cylindrospermum majus B. and F. Larimer County: base of Longs Peak, 9000 feet; montane; on soil among bryophytes and grasses, June 29, 1931, *10201a*.

Scytonemataceae

Scytonema Hofmannii B. and F. Boulder County: Long Lake, 10,400 feet; subalpine; soil among grasses and mosses, August 15, 1938, *6935*.

Scytonema figuratum B. and F. Larimer County: Boulder Field, 12,560 feet; alpine; with other algae in small streamlet, August 22, 1933, *140, 144, 147;* Granite Pass, 11,900 feet; alpine; shallow streamlet, September 17, 1934, *1276*. Boulder County: below Chasm Lake, 11,800 feet; subalpine; in shallow streamlet, August 1, 1934, *1285*.

Scytonema ocellatum B. and F. Custer County: South Colony Basin at base of Humboldt Peak, 11,700 feet; subalpine; soil among bryophytes and lichens, July 8, 1941, *10264*.

Scytonema tolypotrichoides B. and F. Larimer County: Boulder Field, 12,500 feet; alpine; in small streamlet with other algae, August 22, 1933, *141;* Granite Pass, 11,900 feet; alpine; shallow streamlet, September 17, 1934, *1275*.

Tolypothrix conglutinata B. and F. Larimer County: Boulder Field, 12,560 feet; alpine; in shallow streamlet, August 22, September 17, 1933, *142, 146, 158.*

Tolypothrix penicillata B. and F. Larimer County: Alpine Brook at base of Longs Peak, 9100 feet; montane; on submerged, siliceous rocks, October 12, 1936, *5079.*

Tolypothrix tenuis B. and F. Larimer County: Granite Basin, 11,300 feet; subalpine; shallow streamlet, September 14, 1932, *126.*

Desmonema Wrangelii B. and F. Larimer County: Boulder Field, 12,560 feet; alpine; in small streamlet with other algae, August 22, 1933, *142.* Boulder County: east face of Longs Peak, 13,800 feet; alpine; with other algae over mosses on wet, siliceous rock, August 16, 1934, *1288.*

Stigonemataceae

Stigonema mamillosum B. and F. Larimer County: Boulder Field, 12,560 feet; alpine; with other algae in small streamlet, August 22, September 16, 1933, *141, 159.*

This species is probably more abundant than these two records would indicate, but it seems impossible in the field to separate it from *Ephebe solida,* a lichen. Apparently it is only a matter of time and development when fungal hyphae infest the filamentous alga and transform it into the lichen. This lichen is fairly common in cold water and on wet ledges in the alpine zone.

Stigonema minutum B. and F. Larimer County: Boulder Field, 12,560 feet; alpine; with other algae in small streamlet, August 22, 1933, *140.* Boulder County: South St. Vrain Canyon, 7200 feet; montane; wet ground among mosses, September 29, 1938, *8804.*

Stigonema panniforme B. and F. Larimer County: Boulder Field, 12,570 feet; alpine; on ground on squamulose lichens, September 12, 1935, *3253a.*

Stigonema turfaceum B. and F. Larimer County: Boulder Field, 12,560 feet; alpine; with other algae in small streamlet, August 22, 1933, *139;* Granite Pass, 11,900 feet; subalpine; with other algae in shallow streamlet, September 17, 1934, *1276.*

Rivulariaceae

Calothrix parietina B. and F. Boulder County: creek at St. Malo, 8700 feet; montane; on rocks in creek, October 13, 1936, *2346.* Larimer County: near Chasm Lake, 11,700 feet; subalpine; with other algae forming a blackish crust on wet, siliceous cliffs, October 7, 1937, *5682.* Custer County: South Colony Basin at base of Humboldt Peak, 11,700 feet; subalpine; soil among bryophytes and lichens, July 8, 1941, *10275.*

Tribonemataceae

Tribonema bombycinum (Ag.) Derb. and Sol. Larimer and Boulder counties: 22 collections of this species were recorded during the months June, July, August and September at altitudes ranging from 10,400 to 14,000 feet. The plants were found in shallow streamlets, on wet, siliceous rock-cliffs, and over intermittently wet mosses on Longs Peak and vicinity.

Hydruraceae

Hydrurus foetidus (Vill.) Kirchn. Larimer County: Longs Peak, 10,800 feet; subalpine; in shallow streamlet among willows, September 16, 1935, *3384*. Boulder County: Mount Alice, 11,700 feet; alpine; with *Phormidium* in cold, spring rivulet, August 23, 1938, *6453*.

Coscinodiscaceae

Melosira ambigua (Grun.) Müll. Larimer County: east slope at timberline on Longs Peak, 11,100 feet; subalpine; in sediment in shallow pool among willows, September 20, 1933, *162, 163*.

Meridionaceae

Meridion circulare (Grev.) Ag. Boulder County: Hunters Creek on the south side of Longs Peak, 10,000 feet; subalpine; with *Spirogyra* in shallow, running water, September 1, 1934, *1293*.

Diatomaceae

Odontidium anceps Ehr. Larimer County: recorded seven times in August and September, 1933, from the alpine zone on Longs Peak where it was found among other algae or in the sediment of shallow streamlets ranging in elevation from 11,100 at timberline to 13,800 feet on the east face of Longs Peak; Alpine Brook at base of Longs Peak, 9100 feet; montane; on sediment at edge of water, October 2, 1936, *4933*. Boulder County: Hunters Creek on the south side of Longs Peak, 10,000 feet; subalpine; with *Spirogyra* in shallow, running water, September 1, 1934, *1293*.

Odontidium hiemale (Lyngb.) Kütz. Boulder County: Hunters Creek on the south side of Longs Peak, 10,000 feet; subalpine; with *Spirogyra* in shallow, running water, September 1, 1934, *1293*.

Odontidium hiemale var. mesodon (Ehr.) Grun. Larimer County: east slope of Longs Peak at timberline, 11,100 feet; subalpine; in sediment in shallow pool, September 20, 1933, *163a;* Alpine Brook at base of Longs Peak, 9100 feet; montane; on sediment at edge of water, October 2, 1936, *4933*.

Fragilariaceae

Fragilaria Vaucheria (Kütz.) Boyl. Boulder County: Hunters Creek on the south side of Longs Peak, 10,000 feet; subalpine; September 1, 1934, *1293*.

Eunotiaceae

Eunotia monodon Ehr. Larimer County: Boulder Field, 12,560 feet; alpine; shallow streamlet, August 22, 1933, September 12, 1935, *155, 3254.* Boulder County: east face of Longs Peak, 13,800 feet; alpine; with other algae over mosses on wet, siliceous rock, August 16, 1934, *1288.*

Eunotia praerupta Ehr. Boulder County: east face of Longs Peak, 13,800 feet; alpine; with other algae over mosses on wet, siliceous rock, August 16, 1934, *1288.* Larimer County: Boulder Field, 12,567 feet; alpine; with sterile *Zygnema* in shallow streamlet, September 12, 1935, *3254.*

Eunotia robusta Ralfs. Larimer County: Boulder Field, 12,567 feet; alpine; with sterile *Zygnema* in shallow streamlet, September 12, 1935, *3254.*

Eunotia tridentula var. perminuta Grun. Larimer County: east slope of Longs Peak, at timberline, 11,100 feet; subalpine; in sediment in shallow pool among willows, September 20, 1933, *163a;* Granite Pass, 11,900 feet; alpine; with other algae in shallow streamlet, September 17, 1934, *1274.*

Ceratoneis arcus (Ehr.) Kütz. Boulder County: Hunters Creek on the south side of Longs Peak, 10,000 feet; subalpine; with *Spirogyra* in shallow, running water, September 1, 1934, *1293.* Larimer County: Alpine Brook on Longs Peak, 9100 feet; montane; in creek, October 2, 1936, *4933.*

Achnanthaceae

Achnanthes lanceolata (Breb.) Grun. Larimer County: east slope of Longs Peak at timberline, 11,100 feet; subalpine; in shallow pool among willows, September 8, Sept. 20, 1933, *137, 163a.* Boulder County: Hunters Creek on the south side of Longs Peak, 10,000 feet; subalpine; with *Spirogyra* in shallow, running water, September 1, 1934, *1293.*

Achnanthes marginulata Grun. Larimer County: Boulder Field, 12,560 feet; alpine; in sediment of small streamlet, August 22, 1933, *148.*

Naviculaceae

Pinnularia borealis Ehr. Boulder County: east face of Longs Peak, 13,800 feet; alpine; with other algae over mosses on wet, siliceous rock, August 16, 1934, *1288.* Larimer County: Boulder Field, 12,567 feet; alpine; with sterile *Zygnema* in shallow streamlet, September 12, 1935, *3254.*

Nitzschiaceae

Hantzschia amphioxys (Ehr.) Grun. Larimer County: east slope at timberline on Longs Peak, 11,100 feet; subalpine; from sediment of shallow pool among willows, September 8, 1933, *137.*

Chlamydomonadaceae

Chlamydomonas nivalis Wille. Larimer County: Jims Grove, Longs Peak, 11,200 feet; alpine; in surface of snow on snowpatch, September 14, 1933, *180;* Iceberg Lake, 12,000 feet; alpine; in surface of snow on snowpatch, September 21, 1935, *3362.* Custer County: Crestone Needle, 12,500 feet; alpine; in surface of snow, July 10, 1941, *10227.* This species is the cause of the phenomenon known as "red snow." It occurs sporadically during certain years and not in others, but when it does occur it usually is found on all the larger patches of snow. Numerous microscopic examinations were made of this snow organism in the living condition, but no motile cells were ever observed. Based on literature and illustrations, the writer identifies the organism as this world-wide species. Much more, however, needs to be known about the taxonomy and biology of this interesting plant.

Chlamydomonas yellowstonensis Kol. Custer County: South Colony Basin at base of Humboldt Peak, 10,700 feet; subalpine; inside of surface of snow in residual snowdrifts in spruce forest, July 2, July 11, 1941, *10228.*

On parts of residual, fast-melting snowdrifts, whose surfaces were soiled by dirt and pine needles, a greenish tinge was observed. Upon scratching these tinged surfaces, a much more vivid green color appeared. A small glass jar was filled with "green snow" and taken along to camp at timberline where the jar was kept in a snowdrift for eight days. The snow inside the jar melted and the green algae settled on the bottom of the jar, but before eight days were ended, the algae had deteriorated. On July 11, upon leaving camp, another collection was made and preserved in formalin. These plants seem to agree with the description and illustrations as recently published by Erzsebet Kol (Am. Jour. Bot. 28: 185–190. 1941). There were, however, no motile cells observed. On the whole the cells averaged slightly larger in size in this material. The snow drifts were similar to those figured by Kol and also were from the spruce-fir life zone.

Palmellaceae

Gloeocystis vesiculosa Näg. Boulder County: east face of Longs Peak, 12,500 feet; alpine; growing on lichen squamules on siliceous rock-ledges, August 9, 1936, *3866.*

Asterococcus superbus (Cienk.) Scherff. Larimer County: Boulder Field, 12,560 feet; alpine; with other algae in shallow streamlet, September 16, 1933, *173.*

Tetrasporaceae

Tetraspora gelatinosa (Vauch.) Desv. Boulder County: near Sandbeach Lake, 10,400 feet; subalpine; in small brook, September 1, 1934, *1273.*

Coccomyxaceae

Ourococcus bicaudatus Grobety. Boulder County: north face of Longs Peak, 14,000 feet; alpine; growing with *Schizogonium* on wet, siliceous rock-ledges, July 25, 1933, *167*.

Ulotrichaceae

Ulothrix aequalis Kütz. Larimer County: Boulder Field, 12,560 feet; alpine; with other algae in shallow streamlet, September 16, 1933, *160*.

Ulothrix tenerrima Kütz. Larimer County: Boulder Field, 12,560 feet; alpine; with other algae in shallow streamlet, August 22, 1933, *153*.

Ulothrix zonata (W. and M.) Kütz. Larimer County: Big Thomson Canyon, west of Loveland, 6500 feet; montane; floating in still water, September 26, 1942, *13274*.

Stichococcus bacillaris Näg. Boulder County: north face of Longs Peak, 14,000 feet; alpine; growing with *Schizogonium* on wet, siliceous rock-ledges, July 25, 1933, *167*.

Stichococcus subtilis (Kütz.) Klerck. Larimer County: east slope at timberline on Longs Peak, 11,100 feet; subalpine; inside of old bottle on soil under willows, September 16, 1933, *168;* between siliceous rocks in snow water, September 20, 1933, *178*. Boulder County: north face of Longs Peak, 14,000 feet; alpine; growing on wet ledges, July 25, 1933, *167a, 167b*.

Microsporaceae

Microspora Willeana Lagerh. Larimer County: east slope of Longs Peak at timberline, 11,100 feet; subalpine; between siliceous rocks in snow water, September 20, 1933, *165*. Boulder County: Sandbeach Lake, 10,400 feet; subalpine; floating in shaded streamlet in spruce forest, September 1, 1934, *1291;* east face of Longs Peak, 13,700 feet; alpine; over wet mosses on siliceous rock-ledges, August 21, 1936, *4005*.

Microspora amoena (Kütz.) Rabh. Larimer County: Alpine Brook, at base of Longs Peak, 8900 feet; montane; shallow, running water, September 22, 1942, *13126*.

Chaetophoraceae

Draparnaldia acuta (Ag.) Kütz. Boulder County: Sandbeach Lake, 10,350 feet; subalpine; shallow water of outlet, September 12, 1937, *5595*.

Schizogoniaceae

Schizogonium spp.

Prasiola spp.

Many representatives of these two genera were found but they need further study.

Chlorococcaceae

Chlorococcum humicola (Näg.) Rabh. Boulder County: north face of Longs Peak, 14,000 feet; alpine; growing on wet rock-ledges, July 25, 1933, *167a.* Larimer County: Alpine Brook on Longs Peak, 9600 feet; subalpine; in rapids of creek, growing with *Prasiola,* September 18, 1935, *3361b.*

Trebouxia Cladoniae (Chod.) G. M. Smith. Larimer County: Hewes Kirkwood at base of Longs Peak, 9100 feet; montane; granite rock on ground, from surface to 5 mm. deep under quartz crystals, October 14, 1936, *2444, 2445;* Cabin Rock on Twin Sisters Mountain, 9500 feet; subalpine; in surface layer of granitic rock, September 25, 1937, *6297;* east slope of Longs Peak at timberline, 11,100 feet; subalpine; over moss on ground, September 13, 1939, *9085;* east slope of Longs Peak, 9400 feet; subalpine; on soil and over mosses, September 23, 1942, *13187.* Boulder County: summit of Longs Peak, 14,250 feet; alpine; in surface layer of granitic rock, September 14, 1936, *4146.* Saguache County: Crestone Needle, 13,000 feet; alpine; soil and over *Selaginella,* July 8, 1941, *10300b.* Custer County: South Colony Basin at base of Humboldt Peak, 11,500 feet; subalpine; growing on lichen squamules, July 9, 1941, *10390.*

Oocystaceae

Chlorella vulgaris Beyer. Boulder County: west face of Longs Peak, 13,750 feet; alpine; growing with *Schizogonium* over wet, siliceous rocks, July 26, 1932, *1282.*

Ankistrodesmus falcatus (Corda) Ralfs. Boulder County: north face of Longs Peak, 14,000 feet; alpine; growing with *Schizogonium* on wet, siliceous rock-ledges, July 25, 1933, *167.*

Vaucheriaceae

Vaucheria sessilis (Vauch.) DC. Boulder County: Chasm Gorge, 12,200 feet; alpine; floating in cold streamlet, September 2, 1933, *134, 135.* Larimer County: Mount Lady Washington, 12,000 feet; alpine; bottom of dried-up streamlet, July 31, 1936, *4435;* Alpine Brook on Longs Peak, 9100 feet; montane; wet bank, August 10, 1935, *4948.*

Zygnemataceae

Zygnema insigne (Hass.) Kütz. Boulder County: Thunder Lake, 10,520 feet; subalpine; floating in shallow water at edge of Lake, August 27, 1931, *103.*

Zygnema pectinatum var. anomalum (Ralphs) Kirchner. Larimer County: Boulder Field, 12,560 feet; alpine; shallow streamlet, August 22, 1933, *155.*

Zygogonium ericetorum Kütz. Boulder County: Chasm Lake, 11,800 feet; subalpine; on wet, siliceous rock-cliff, September 18, 1934, *1290.*

Mesotaeniaceae

Cylindrocystis Brebissonii Menegh. Boulder County: near summit of Longs Peak, 14,000 feet; alpine; with *Schizogonium* over moss on wet, siliceous rock, July 22, 1932, *111;* east face of Longs Peak, 12,500 feet; alpine; over lichen squamules on wet, siliceous rock-ledges, August 9, 1936, *3866.*

Desmidiaceae

Hyalotheca dissiliens (Smith) Breb. Boulder County: Sandbeach Lake, 10,350 feet; subalpine; shallow water of outlet, September 12, 1937, *5595.*

Desmids were generally not absent in the collections, particularly those made from the alpine zone, but were never abundant enough for separate determinations.

Characeae

Chara contraria A. Br. Larimer County: Marys Lake, 8000 feet; montane; on bottom in shallow water, August 3, 1930, *2278.* Determined by R. D. Wood.

Game, Forestation and Parks Commission, State of Nebraska,
and
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REVIEW

Las Pináceas Mexicanas. By Maximino Martínez. Instituto de Biologia, Mexico, D. F., 1945. 345 pp. + 6 pp. index, 300 figs. (180 line drawings, 120 half tones), paper cover. Published also as: Tom. 16, Anales del Instituto de Biologia de la Universidad Nacional de Mexico. 1945.

This book is the result of years of meticulous work by Professor Martínez and is comprehensive in its taxonomic treatment of the genus *Pinus* in Mexico. It contains an extensive discussion of the genus, based on the pines of the New World, under such headings as seed, germination, trunk, bark, buds, branchlets, needles, leaf-sheaths, cones, and several other categories dealing with subheadings under some of the above.

Discussions of damaging insects, fungi, and other pests, of methods used to protect pine lumber, of turpentining methods, and of production and export of resins and other naval stores take up the remainder of the first fifty-two pages. Immediately following is a series of lists, each one giving the species, varieties and forms known to grow in one of the twenty-six states and territories covered. Jalisco and Mexico share honors with seventeen named entities credited to each.

On page fifty-six Professor Martínez begins his discussion of the classification of the pines of Mexico with a brief account of the history of the subject. The taxonomy of *Pinus* in Mexico